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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/986,287

11/08/2001

Hiroki Obi

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09/29/2004

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ALEXANDRIA, VA 22314

EXAMINER

STREGE, JOHN B

ART UNIT

PAPER NUMBER

2625

DATE MAILED: 09/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/986,287

Applicant(s)

OBI, HIROKI

Examiner

John B Strege

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5-13 and 18-30 is/are allowed.
- 6) ☒ Claim(s) 1-3 and 14-16 is/are rejected.
- 7) ☒ Claim(s) 4 and 17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>3</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3,14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Applicant's admitted prior art in view of Back et al. USPN 6,002,426 (hereinafter "Back").

Claim 1 recites, "A method for moving a main chuck on which first objects are set in X, Y, Z, and theta directions to align the first objects with second objects arranged above the first objects." In figures 6A and 6B of the Applicant's admitted prior art, a method is shown for moving a main chuck 6 on which a wafer W is set in order to align the wafer with the a probe card having probes 8A (page 2 lines 4-18). Claim 1 further recites;

(a) photographing the second objects through second photographing means to obtain second photographed images." The Applicant's admitted prior art discloses, an upper CCD camera 7B provided for photographing the main chuck that holds the wafer containing electrode pads (second objects) (page 2 lines 26-27, and page 3 lines 20-27).

(b) displaying second virtual data images in a second image data area on a monitor screen of a display device on the basis of the second photographed

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images of the second objects. The Applicant's admitted prior art discloses that the photographed images of the probes 8A and wafer W are displayed on a monitor screen 9A of a display device 9 (page 3 lines 1-3). The Applicant's admitted prior art does not explicitly disclose that the second data is virtual data.

(c) allowing an optical axis of the second photographing means to match an optical axis of first movable photographing means to obtain a reference position of the main chuck. The Applicant's admitted prior art discloses that the optical axis of the upper CCD camera 7B arranged at the center of the probes is allowed to match the optical axis of the lower CCD camera 7A fixed to the main chuck, and the position at that time is set to the reference position of the main chuck (page 3 lines 9-13, and page 3 line 27 – page 4 line 5).

(d) moving the main chuck to align the first objects with the first photographing means and then photographing the first objects through the first photographing means to obtain first photographed images. The Applicant's admitted prior art discloses that the main chuck 6 is moved on the basis of the calculation results to align the target probes 8A with the target electrode pads (page 4 lines 16-18).

(e) displaying first virtual data images of the first photographed images in a first image data area on the monitor screen of the display device on the basis of design data of the first objects. The Applicant's admitted prior art discloses that the photographed images of the probes 8A and wafer W are displayed on a monitor screen 9A of a display device 9 (page 3 lines 1-3). The Applicant's admitted prior art does not explicitly disclose that the first data is virtual data.

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The Applicant's admitted prior art does not explicitly disclose (f) relatively moving the first virtual data images and the second virtual data images on the monitor screen to superimpose both the virtual data images on each other; and (g) determining a position where both the virtual data images are most fitly superimposed on each other as an alignment position of the first and second objects.

Back recites a method and apparatus for calibrating probe cards to ensure that appropriate overdriven probe needles are in proper alignment with bonding pads of an integrated circuit chip (col. 1 lines 6-12). A first video camera captures an image of the probe needles (col. 2 lines 65-66). A second video camera in optical alignment with the first video camera captures an image of mask spots corresponding to positions of contact pads of an integrated circuit to be tested (col. 3 lines 5-11). Back further recites circuitry combining video signals produced by the first and second video cameras to simultaneously represent images of the probe needles and a display simultaneously displaying overlapping images of the probe needles (col. 3 lines 11-17). The image data are simultaneously displayed in a virtual reality headset thus they are virtual data (col. 3 line 61 – col. 4 line 42, also in the abstract). Using the virtual reality headset 14 the operator can bring the probe needles into alignment with corresponding dots of the mask representing the contact pads thus determining a position where both the virtual data images are most fitly superimposed on each other as an alignment position (col. 4 line 33-42). Using this approach results in improved, more precise and planar positioning of probe needle tips.

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The Applicant's admitted prior art and Back are analogous art because they are from the same field of endeavor of aligning probe needles with the contact pads of a wafer using a display.

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine the Applicant's admitted prior art with Back to obtain a system that produces virtual data of the probes and contact pads used to align them. The motivation for doing so would be to have more precise planar positioning of the probe needle tips as stated by Back. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the Applicant's admitted prior art and Back to obtain the invention as specified in claim 1.

Regarding claim 2, as discussed above the Applicant's admitted prior art discloses that the second photographing means is provided for the main chuck.

Regarding claim 3, as discussed above the Applicant's admitted prior art discloses that the objects for one camera are a plurality of electrode pads and the objects for the other camera are a plurality of probes (page 3 lines 20-27).

Claim 14-16 are similar to claim 1-3 except claims 14-16 are apparatus claims. As the Applicant's admitted prior art and Back are both suitable for method and apparatus, the same arguments used above for the rejection of claims 1-3 apply equally to the rejection of claims 14-16.

Allowable Subject Matter

3. Claims 5-13, and 18-30 allowed.

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4. The following is a statement of reasons for the indication of allowable subject matter: Regarding claim 5, none of the prior art discloses a method for aligning a plurality of electrode pads arranged on an object to be inspected with a plurality of contacts formed on a probe card comprising in combination with the other claimed steps displaying the virtual data of the electrode pads and contactors as colored images, and then measuring the luminance of each portion where the virtual data are superimposed on each other in order to detect a superimposing state of the first virtual data image and the second virtual data image. The Applicant's admitted prior art and Back which are the closest prior art as discussed above fail to disclose these limitations, thus claim 5 is allowable. Claims 12, 18, 25, 27, and 29 claim similar limitations to claim 5 thus are also allowable for the reasons given above. Claims 6-11, 13, 19-24, 26, 28, and 30 are dependent on the allowable independent claims, thus they are allowable for the same reasons given for the base claims.

5. Claims 4, and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John B Strege whose telephone number is (703) 305-8679. The examiner can normally be reached on Monday-Friday between the hours of 8-5.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JS



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